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REPORT

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PROBABLE HARDENED ANTENNAS AT TYURATAM MISSILE TEST CENTER AND DOMBAROVSKIY ICBM COMPLEX

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PROBABLE HARDENED ANTENNAS AT TYURATAM MISSILE TEST CENTER AND DOMBAROVSKIY ICBM COMPLEX, USSR

ABSTRACT

1. Seven new types of probable hardened antennas in various stages of construction have been identified at the Tyuratam Missile Test Center and the Dombarovskiy ICBM Complex. These probable hardened antennas are associated with launch sites for the SS-X-17, SS-X-18, or SS-X-19 missile systems and the type IIIX probable control sites.

2. This report includes a location map, 11 annotated photographs, and tabular data.

INTRODUCTION

3. Seven new types of probable hardened antennas are under construction at the Tyuratam Missile Test Center (TTMTC) and the Dombarovskiy ICBM Complex, USSR. The pattern for deployment of these antennas is not readily apparent since the numbers and types of antennas vary from site to site.

4. The TTMTC antennas are at launch sites in launch groups R and S and sites T1 and T2 (Figure 1). These sites are associated with the research and development of the SS-X-17, SS-X-18, or the SS-X-19 missile systems. The antennas are also at the two type IIIX probable control sites, R1 and S4, at TTMTC.

5. Additionally, three types of these antennas have been identified at a deployed ICBM complex, Dombarovskiy. Two of these antennas are at type IIIX probable control site 75 and one is nearly complete at type IIIF launch site 73.

6. The identification of these seven geometric features as probable hardened antennas is based on their association with a known hardened antenna (herringbone) and the presence of cable trenches from the geometric shapes to the silo area.

7. The operating frequencies and propagation azimuths of these seven probable hardened antenna types have not been derived because of the lack of technical information on Soviet hardened antennas.

BASIC DESCRIPTION

8. The seven new types of probable hardened antennas, for ease of reference, have been arbitrarily designated as: hook, dome, ell (previously designated as a hardened vee, type III), circular, wedge, plus, and quad-tri. These designators have been assigned on the basis of the current physical configuration of the probable antennas.

9. Examples of each type of probable hardened antenna are shown in Figures 2 through 8. Representative examples of the antennas as they relate to one another within a launch group are shown in Figures 9 through 12. Measurements are necessarily preliminary because the construction is still incomplete.

10. The type and number of the antennas and the associated launch sites where they have been identified are presented in Table 1. The dates of first observation of these antennas are given in Table 2.

Probable Hardened Hook Antenna

11. The most numerous of the seven antenna types is the hook (Figure 2). As of October 1973, 13 of these antennas have been identified at launch sites at TTMTC within launch groups R and S and at sites T1 and T2. This antenna was first seen under construction at type IIIF launch site R8 in October 1972. All were still under construction in October 1973.

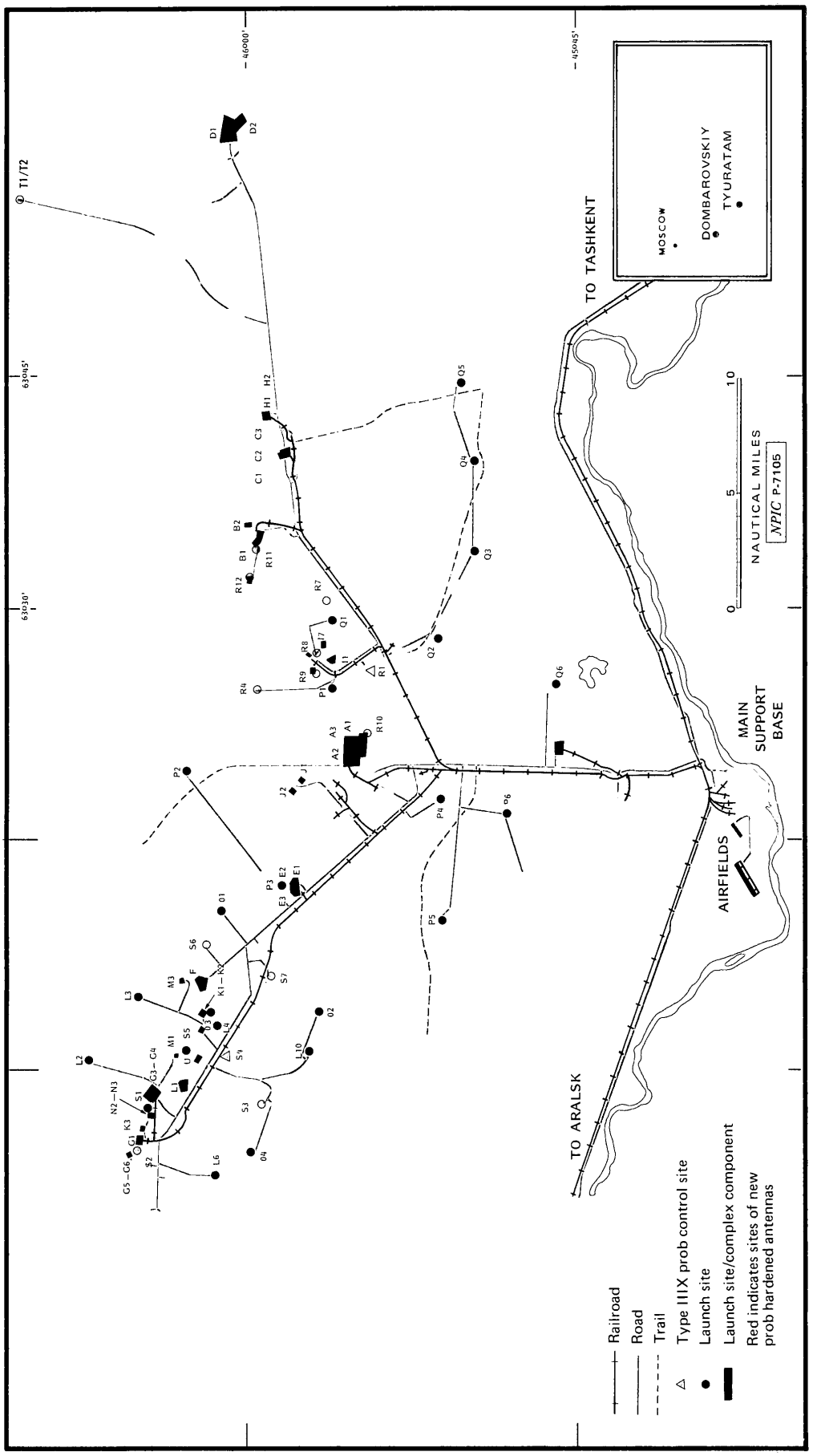

FIGURE 1. LOCATIONS OF PROBABLE HARDENED ANTENNAS AT THE TYURATAM MISSILE TEST CENTER, USSR. The inset also shows the general location of the Dombarovskiy ICBM Complex which is the only deployed complex where these antennas have been identified to date.

12. The hook consists of three linear trenches, in a hook-shaped pattern. The antenna appears to be connected to the silo headworks by a cable trench which intersects the longest of the three trenches.

Probable Hardened Dome Antenna

13. Eight domes have been identified at TTMTC and one at Dombarovskiy launch site 73 (Figure 3). Seven of the TTMTC antennas and the one at Dombarovskiy are at type IIIF launch sites and the eighth is at type IIIX probable control site R1, TTMTC. The first antenna was seen under construction at launch site R10, TTMTC, in October 1972. All eight antennas now appear to be almost externally complete.

14. This antenna consists of a recessed dome encircled by a probable concrete ring. The ring appears to be flush with ground level whereas the top of the dome appears to be slightly below ground level. Prior to completion, a dark-toned substance is applied to the dome and the ring. A cable trench extends from the antenna; however, the termination point has not been determined. At launch site T1 and T2 a small section of circular conduit was seen in the cable trench next to the concrete ring. This is the first discernible evidence of conduit being installed in the cable trench. At probable control site R1 the antenna appeared to have been covered by a dark-toned circular cover. This cover may subsequently appear on the other dome antennas and could be for environmental protection.

Probable Hardened Ell Antenna

15. The ell (Figure 4) has been identified at four launch sites and the two probable control sites (all at TTMTC) and at the Dombarovskiy probable control site. There are two ells at TTMTC probable control site R1 and two were begun at launch site R4. The two at site R4 were started in November 1972, but no construction activity has been seen since that date. The first ell antenna was seen under construction at probable control site R1 in July 1972. The antennas at TTMTC are being constructed outside the site security fence; however, the antenna at Dombarovskiy is within the fences.

16. The ell consists of two sets of four long parallel trenches that intersect at right angles to each other to form the apex of the L-shaped pattern. The length of the trenches and the separation between them vary from antenna to antenna. These antennas are connected to the site area by a cable trench from a point near the apex.

Probable Hardened Circular Antenna

17. Two circular antennas have been identified in launch group S at TTMTC and one at Dombarovskiy probable control site 75. This antenna was first seen under construction at TTMTC probable control site S4 in July 1973.

18. The antenna is constructed in a circular dish-shaped excavation At probable control site S4 a cable trench extends from the edge of the antenna to an excavation next to the silo apron (Figure 5).

Probable Hardened Wedge Antenna

19. The wedge has been seen at the two probable control sites, R1 and S4, at TTMTC (Figure 6). This type of antenna was first seen under construction at site R1 in October 1972.

20. The antenna is constructed in a wedge-shaped excavation with the wider end of the wedge closer to the site. A cable trench extends from the wide end to the site apron near the silo headworks. The antenna at probable control site R1 was being covered with a dark-toned substance in October 1973. A probable concrete trough was seen within the wedge-shaped excavation at probable control site S4, also in October 1973.

Probable Hardened Plus Antenna

21. The plus has been identified at four launch sites in launch groups R and S at TTMTC (Figure 7). The first antenna was seen at type IIIF launch site R11 in May 1973.

22. The plus antenna consists of two trenches which intersect at right angles at the middle of the two trenches. A cylinder is in a vertical position at the center of the plus. A cable trench extends from the center of the plus and will probably terminate near the silo headworks. At launch site R4 and R11 a probable concrete trough has been constructed within the plus-shaped trenches.

Probable Hardened Quad-Tri Antenna

23. The quad-tri has been seen at the two type IIIX probable control sites at TTMTC (Figure 8). Four of these antennas are at site R1 and one is at site S4. Construction for the first of these antennas was seen in October 1972.[1]

24. The quad-tri antenna begins with a gridwork structure at the bottom of a square excavation, a vertical cylinder with an approximate outer diameter of 10 feet in the center of the gridwork, and five vertical uprights along each side of the gridwork. Four triangular structures are then placed around the cylinder with the apex of each triangle pointing inward toward the cylinder. Next, the triangles are attached to the vertical uprights. Then the excavation is backfilled. A cable trench extends from one corner of this antenna to the edge of the silo apron.

Table 1. Type and Number of Antennas Observed at Each Site

Missile System & Complex/Group/Site	Type Site	New Probable Hardened Antenna Types						
		Hook	Dome	Ell	Circular	Wedge	Plus	Quad-Tri
SS-X-17 ICBM								
TTMTC S6	Mod IIID	1		1			1	
TTMTC S7	Mod IIID	1						
SS-X-18 ICBM								
TTMTC R4	IIIF	1	1	2			1	
TTMTC R7(N)	IIIF	1	1					
R7(S)	IIIF	1	1					
TTMTC R8	IIIF	1						
TTMTC R9	IIIF	1						
TTMTC R10	IIIF		1	1				
TTMTC R11	IIIF	1					1	
TTMTC R12	IIIF	1	1					
TTMTC T1	IIIF	1	1	1				
TTMTC T2	IIIF	1	1					
Dombarovskiy ICBM Complex 73	IIIF		1					
SS-X-19 ICBM								
TTMTC S2	IIIG	1			1			
TTMTC S3	IIIG	1					1	
Probable Control Site								
TTMTC R1	IIIX		1	2		1		4
TTMTC S4	IIIX			1	1 (prob)	1		1
Dombarovskiy 75	IIIX			1	1 (prob)			

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Table 2. Dates of Observations of Antenna

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Type Probable Hardened Antenna	Complex/Group/Site
Hook	TTMTC R8
	TTMTC R9
	TTMTC R12
	TTMTC S2
	TTMTC R4
	TTMTC S6
	TTMTC R7(N)
	R7(S)
	TTMTC R11
	TTMTC S7
	TTMTC T1
	TTMTC T2
	TTMTC S3
Dome	TTMTC R1
	TTMTC R10
	TTMTC R4
	Dombarovskiy 73
	TTMTC R12
	TTMTC R7(N)
	R7(S)
	TTMTC T1
	TTMTC T2
Ell	TTMTC R1
(2)	TTMTC R4
	TTMTC S4
	TTMTC R10
	TTMTC S6
	TTMTC T1
	Dombarovskiy 75
Circular	TTMTC S4
	TTMTC S2
	Dombarovskiy 75
Wedge	TTMTC R1
	TTMTC S4
Plus	TTMTC R11
	TTMTC R4
	TTMTC S3
	TTMTC S6
Quad-Tri (4)	TTMTC R1
	TTMTC S4

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REFERENCES

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MAPS AND CHARTS

SAC. US Air Target Chart, Series 200, Sheets 0246-13 and -14 and 0236-10, scale 1:200,000

DOCUMENT

1. NPIC RCA-15/0003/74, *Activity and Developments at Tyuratam Missile Test Center, December 1972 - June 1973*, Sep 73 (TOP SECRET CHESS RUFF

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